

An exogenic origin for Iapetus' ridge

Saturn's moon Iapetus has a ridge around its equator reaching heights of up to 20 km. At 1300 km in length, the ridge extends $\frac{3}{4}$ of the way around the satellite.

A potential formation mechanism for the ring involves a collapsing debris disk in orbit around the moon:

- The first impact occurs at grazing angle, does not form a crater, and the fragmented impactor comes to rest on surface.
- The next impact smashes into fragments of an earlier projectile.
- Successive impacts are all aligned on the equator and continue to accrete material.
- The result is a raised feature—the ridge.



Simulations of these grazing impacts on an icy moon demonstrate the process (left). The key parameters that enable this are low impact velocity and grazing incidence angle.

A collapsing disk of debris could build topography to create a ridge around Iapetus